

NOV 30 1998

Thatcher Montgomery, Sr. Environmental Engineer
 Aluminum Company of America
 Alcoa Technical Center
 100 Technical Drive
 Alcoa Center, Pennsylvania 15069-0001

Dear Mr. Montgomery:

The National Program Chemicals Division (NPCD) of the U.S. Environmental Protection Agency (EPA) amends the PCB Disposal Research and Development (R&D) Approval granted August 18, 1993 and recently extended to August 18, 1999. This R&D approval allows Alcoa to test methods of enhancing biological degradation of PCBs in solid and water waste matrices belonging to Alcoa. Such methods include chemical pretreatments, slurry reactors, soil pans, and adsorption/desorption. This amendment authorizes Alcoa to perform tests at the Alcoa Technical Center in Alcoa Center, Pennsylvania, to determine the effectiveness of surface cleaning and coating techniques on PCB contaminated concrete, which are authorized for continued use at 40CFR761.30(p). Because Alcoa requires one year to complete this study, the effective dates for the R&D approval shall be from the date of signature to November 30, 1999.

In a letter dated September 9, 1998, Alcoa requested approval to conduct this research pursuant to 40CFR 761.60(j). The concentration of PCBs in the concrete to be tested exceeds the limitation for self-implementation in 40CFR 761.(j)(1)(iii) and requires prior written approval from EPA per §761.60(j)(2). Alcoa plans to ship concrete floor core samples from various locations in California which contain PCB levels up to 11,000 ppm. Other locations which may be applicable for research include plants in Alcoa Center, Pennsylvania; Cleveland, Ohio; Riverdale, Iowa; Lafayette, Indiana; Lebanon, Pennsylvania; Alcoa, Tennessee; and Newburgh, Indiana.

The proposed studies will include a series of tests to treat a total of about 500 pounds of concrete contaminated with PCBs. Core samples for treatment will be 8 inches in diameter and 5 - 8 inches long and core samples for characterization will be 2 inches in diameter and 5 - 8 inches long. Alcoa will evaluate three different techniques for removing oil and PCB from contaminated concrete. Subsequently, Alcoa will study the rate of "bleedback" of PCBs to the surface and study the effects of oil spills on the surface on the rate of bleedback to the surface.

CONCURRENCES

SYMBOL								
SURNAME								
DATE								

HDodohara:hd/OPPT-NPCD-FOB/11-25-98/7404/260-3959/Rm ET837/D25:"AMEND98.R&D.wpd"
 FOB Chron:Reading File/DS File/Subject File
 R&D approval, concrete cleaning

Alcoa may request, with justification, to treat additional concrete core samples from Vernon, CA or from other facilities. Please note that storage of samples from facilities not affiliated with Alcoa, exceeding 500 gallons of PCB liquids or 70 cubic feet of PCB solids, or a total of 500 gallons of a mixture of PCB liquid and solids requires that each receiving facility have a TSCA PCB storage approval. This R&D approval was granted pursuant to Section 6(e)(1) of the Toxic Substances Control Act of 1976 (TSCA), Public Law No. 94-469, and the Federal PCB Regulations, 40 CFR 761.60(e) (48 Federal Register, 13185, March 30, 1983) (Alternate Method) and 40 CFR 761.60(j)(iii).

This approval limits the testing of PCB contaminated material for the biodegradation studies for any one project to approximately 150 pounds of soil and/or sludge ranging in concentration from 10 ppm to 2,000 ppm PCBs; 100 gallons of water ranging in concentration from 1 ppb to 100 ppm PCBs; and two liters of oil ranging in concentration from 10 ppm to 5,000 ppm PCBs. may be used. For the contaminated concrete studies, this approval limits the testing of PCB contaminated material for any one project to approximately 500 pounds of core samples

The handling, storage, and disposal of wastes from this project will be based on the undiluted PCBs concentration prior to treatment in accordance with the TSCA regulations. This means the material as found at the particular ALCOA location from which each sample was obtained and shipped to the Alcoa Technical Center for treatability testing.

A final test report on each different project shall be submitted to NPCD no later than 90-days after the completion date of testing, or after the expiration date of the permit, whichever comes first. Please direct matters concerning this subject to Hiroshi Dodohara of my staff on (202) 260-3959.

Sincerely,

John W. Melone, Director
National Program Chemicals Division

Enclosure

cc:

Ed Cohen
Region III

Yosh Tokiwa
Region IX

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

APPROVAL TO CONDUCT RESEARCH AND DEVELOPMENT TESTS
TO DISPOSE OF POLYCHLORINATED BIPHENYLS (PCBS)

ALUMINUM COMPANY OF AMERICA
ALCOA TECHNICAL CENTER
ALCOA CENTER, PENNSYLVANIA

R&D STUDIES TO DETERMINE THE EFFECTIVENESS
OF CLEANING AND COATING TECHNIQUES
FOR PCB-CONTAMINATED CONCRETE
PURSUANT TO 40 CFR 761.30(p) FOR AUTHORIZED CONTINUED USE

BACKGROUND

On May 1, 1993, ALCOA submitted a request to conduct research and development (R&D) on the enhancement of biological degradation of PCB-contaminated waste matrices belonging to ALCOA in their ALCOA Technical Center in Pennsylvania. These studies will be carried out in controlled laboratory settings, either directly by or under the supervision of trained, ALCOA technical personnel. On September 9, 1998, ALCOA requested a R&D approval to determine the effectiveness certain cleaning and coating techniques. All evidence available suggests that these studies by ALCOA carried out in accordance with the conditions of this approval will not present an unreasonable risk to human health or the environment.

This approval is issued to the Aluminum Company of America (Alcoa), Alcoa Center, Pennsylvania, to conduct research and development (R&D) tests on the enhancement of biological degradation of PCB-contaminated waste matrices belonging to ALCOA and for determining the effectiveness of surface cleaning and coating techniques on PCB contaminated concrete, which are authorized for continued use at 40CFR761.30(p). The concentration of PCBs in the concrete to be tested exceeds the limitation for self-implementation in 40CFR 761.(j)(1)(iii) and requires approval prior written approval from EPA per §761.60(j)(2).

Authority

This approval to conduct R&D into PCB disposal is issued pursuant to Section 6(e)(1) of the Toxic Substances Control Act of 1976 (TSCA), Public Law No. 94-469, and the Federal PCB Regulations, 40 CFR Part 761.60(e) and (j), (48 Federal Register, 13185, March 30, 1983) and 40 CFR 761.60(j)(iii).

Effective Dates

This R&D approval will become effective on the date of signature and will expire December 11, 1999.

Proposed Tests

a. Biodegradation Research

ALCOA will study samples of solid and liquid wastes obtained from PCB-contaminated sites belonging to ALCOA to develop and evaluate techniques for the enhancement of biological technologies for later use in full-scale remediation of the contaminated sites. These studies will help determine the potential for the use of relatively low cost biological technologies to treat PCBs to environmentally sound levels without adverse by-products.

Research has shown that PCBs do biodegrade in the environment and in laboratory studies, but at a very slow rate. However, no one yet has demonstrated a process to EPA that can accelerate PCB biodegradation to rates necessary to make such a process commercially viable. In addition, even though the susceptibility to biodegradation of PCBs found in soil and sludge materials has been demonstrated, treatment of all PCB congeners to below certain plateau levels has been technically unachievable. Thus, physical and/or chemical pretreatment to increase bioavailability may enhance biodegradation by lowering achievable treatment levels for all PCB congeners.

There is evidence to suggest that the bioremediation of sparingly soluble, hydrophobic organic molecules, like PCBs, found in soil and sludge matrices, may be limited by the physical availability or proximity of these compounds to the microbial surfaces, rather than by the inability of the microorganisms to metabolize the compounds. If this is so, relevant physical characteristics of the PCB congeners in soils and sludges, such as adsorption/desorption rates and solubilities, can be compiled from the available literature and from laboratory studies, and then projections about the rates of biodegradation of the congeners can be made from the data.

When values for aqueous solubilities, octanol-water partition coefficients, and Henry's Law constants were compiled for the PCB congeners and correlated with the level of chlorination of the PCB congeners, the results were suggestive. These analyses showed that, as the degree of chlorination and hence the molecular weight of the PCB congeners increases, the degree of bioavailability of the congeners should decrease. In addition, the concentration of PCB congeners remaining after traditional bioremediation should reach some irreducible plateau, and the distribution of the remaining PCB congener population should have shifted towards the more highly chlorinated congeners. This is exactly what was seen in General Electric's Hudson River studies carried out in the summer of 1991. The lower chlorinated congeners biodegraded most rapidly, and the process stopped at low concentrations.

In the General Electric and In other PCB bioremediation studies, the residual PCB congeners, while still physically present in the soil/sludge matrix, may for all practical purposes

be immobilized or biostabilized. Therefore, enhancement of the soil/sludge matrix by physical and/or chemical means, such as with the addition of surface active agents or chemical oxidants, may increase the bioavailability of the target organics (PCBs) and lead to the attainment of lower residual concentrations. Likewise, the addition of an organic compound with a chemical structure similar to that of the contaminant may enhance and stimulate the growth of microbial populations that could readily cometabolize the target compounds. These physical and/or chemical process approaches may be applied either before or during bioremediation. They are also compatible with the in situ bioremediation approaches being considered by ALCOA for use in full-scale site remediations.

ALCOA plans to evaluate ways to increase PCB bioavailability and to enhance PCB biodegradation with the following research:

- soil/sludge sorption testing in combination with surfactant screening;
- chemical oxidant screening;
- soil pan degradation studies simulating land treatment;
- biological slurry reactor testing;
- fluidized carbon bed reactor studies for biologically treating wastewater; and
- adsorption/desorption testing of soil/sludge, or oil matrices to determine site-specific partition coefficients for PCB congeners.

As part of this treatability testing program, ALCOA plans to develop and improve its in-house capability for identifying and quantifying PCBs on a congener-specific basis with gas chromatography and mass spectrometry.

b. Contaminated Concrete Research

Alcoa plans to obtain fifteen 8-inch diameter concrete core samples for laboratory tests from the floor of the 5000-ton press pit area the Vernon Works (EPA Generator ID No. CAD074126681, Vernon, CA). Four 2-inch diameter samples will be collected from the same area for characterization of PCB contents. The 2-inch core samples will be analyzed for PCBs as a function of depth. Each core will be divided into 1-inch sections and analyzed separately for Aroclors. Cores samples will be 5 to 8 inches in length and weigh a total not to exceed 500 pounds. The samples may contain PCB levels up to 11,000 ppm which is expected to be concentrated in the top 2 inches of concrete. Upon completion of the study, all PCB contaminated wastes and debris will be sent to an EPA-approved TSCA incinerator for disposal. Other locations which may be applicable for research include plants in Alcoa Center, Pennsylvania; Cleveland, Ohio; Riverdale, Iowa; Lafayette, Indiana; Lebanon, Pennsylvania; Alcoa, Tennessee; and Newburgh, Indiana.

Cleaning Techniques

Eight of the 8-inch diameter cores will be tested for cleaning techniques and PCB "bleedback" to the surface. Initially, all samples will be wipe-tested to determine the magnitude of surface PCB contamination. The surface of the samples will then be cleaned using three

different cleaning techniques which have been employed at other Alcoa facilities, using two cores for each cleaning techniques. One of the three techniques will be duplicated on the remaining two cores. After cleaning, the duplicate cores will be "painted" on the surface with a small amount of clean phosphate ester hydraulic oil currently in use by Alcoa. All the cores will then be covered with aluminum foil.

Surface wipe testing will be performed at approximately two week intervals for a period of eight months. At the end of the eight month period, a 2-inch core sample will be taken from each of the 8-inch core samples. The 2-inch cores will be divided into 1-inch sections and each section will be analyzed for PCB Aroclors. All wipe tests will use conventional surface wipe testing method for PCBs.

Coating Techniques

Six 8-inch core samples will initially be wipe tested to determine extent of PCB contamination. The surface of each core will be cleaned using a technique selected from those tested in the first phase. Three different epoxy coating techniques will be applied to each set of two cores. The cores will then be covered with aluminum foil.

Surface wipe testing will be performed at approximately two week intervals for a period of eight months. At the end of the eight month period, a 2-inch core sample will be taken from each of the 8-inch core samples. The 2-inch cores will be divided into 1-inch sections and each section will be analyzed for PCB Aroclors. All wipe tests will use conventional surface wipe testing method for PCBs.

Conditions of Approval

1. Advance Notification: A thirty-day advance notice of the proposed tests must be provided to the Regional Administrator of EPA Region III, the state of Pennsylvania, and any local officials governing the site where the ALCOA Technical Center is located, and to the EPA Regional Offices, the state and local agencies where the sampling sites are located. These notices must briefly outline the treatability testing program, and include the approximate dates of the testing and the estimated length of the testing. A sample form is enclosed. Copies of these letters must be sent to the Chief, Fibers and Organics Branch (7404), at EPA Headquarters to be kept on file.
2. Other Permits and Approvals: Prior to commencing the tests, ALCOA must obtain any necessary Federal, state or local permits or approvals. During the course of the testing, ALCOA shall comply with all conditions and requirements of such permits or approvals.

3. Feedstock and Restrictions:

a. Biodegradation Research : PCB- contaminated soil, sludge, water and/or oil samples used in these treatability studies will be obtained from PCB- contaminated sites owned by ALCOA or its subsidiaries that are located within the continental United States or its territories. For any one project, a maximum of approximately 150 pounds of soil and/or sludge ranging in concentration from 10 ppm to 2,000 ppm PCBs may be used. For any one project, a maximum of 100 gallons of water ranging in concentration from 1 ppb to 100 ppm PCBs may be used. For any one project, a maximum of two liters of oil ranging in concentration from 10 ppm to 5,000 ppm PCBs may be used.

Solid and liquid waste matrices used in the treatability studies will be sampled and analyzed for PCBs with Gas Chromatography and/or Mass Spectrometry at the beginning of the studies and at intervals for the duration of the studies until the treatment has reduced the concentration of PCB's to less than 3 parts per billion for water; 2 ppm per peak for soils, sediments and sludges; and 10 micrograms per 100 square centimeters for non-porous surfaces. While these levels cited for the various media refer to TSCA cleanup levels, part of the treatability testing is to test various biodegradation approaches and enhancements that may not meet the cleanup levels cited. Regardless of whether the cleanup levels are attained or not, all material used in the studies, both treated and untreated, will be incinerated in a TSCA- approved incinerator when the studies are completed.

b. Contaminated Concrete Research: Alcoa will be limited to about 500 pounds of concrete contaminated with PCBs. Core samples for treatment will be 8 inches in diameter and 5 - 8 inches long and core samples for characterization will be 2 inches in diameter and 5 - 8 inches long. Alcoa may request, with justification, to treat additional concrete core samples from Vernon, CA or from other facilities.

4. Process Waste Restrictions: All waste generated as a result of this process must be disposed of as if it contained the undiluted PCB concentration prior to treatment of the feedstock received at the ALCOA Technical Center from off-site ALCOA locations, unless through representative sampling and analysis, EPA can verify that the waste contains non-detectable concentrations of PCBs (defined as less than 2 parts per million per congener quantitated with the Dye Color Manufacturers Association [DCMA] Standard for all matrices except water, which must contain less than 3 parts per billion total).

This approval does not obligate EPA to take samples. In the event that EPA does not take samples, all PCB waste and treated residues generated during the test(s) must be disposed of as if it contained undiluted PCB prior to treatment.

5. Process Monitoring/Recordkeeping: Plans for sampling and analysis and Quality Assurance are described in ALCOA's permit application on file at EPA Headquarters. Sampling and analysis will be conducted on all PCB- contaminated solid and liquid matrices used in this R&D project to establish baseline conditions and subsequently to monitor various parameters during the project.

For the biodegradation studies, the results of all sampling, analytical, and monitoring activities must be recorded throughout the R&D activity. The results include the following:

- a. initial PCB concentration of all samples of solid and liquid matrices analyzed;
- b. final PCB concentration of all samples of solid and liquid matrices analyzed;
- c. rate(s) of PCB degradation monitored in study samples;
- d. the PCB concentration of any air samples analyzed to measure potential PCB losses through volatilization;
- e. any initial and final toxicity tests; and
- f. specific partition coefficients between soil/sludge and water, and between oil and water.

6. R&D Test Report: A test report for each project shall be submitted to EPA Headquarters no later than 90 days after the completion date of testing or after the expiration date of the permit, whichever comes first. All test results and related information on this R&D project shall be incorporated into the test report to be submitted to OPPT for evaluation. The R&D test reports shall include, at a minimum, the following items:

- a. Certification Letter. This letter, signed by an authorized official of ALCOA, must certify on behalf of the applicant that the tests were carried out in accordance with the approved conditions of this permit, and that the results of all determinations are submitted in the report. Any changes or deviations from the conditions of this permit must be authorized in advance by the permitting authority and documented in writing in the report.
- b. Detailed discussion of all process operations, operational problems, if any, and corrective actions.
- c. Chronology of significant events.
- d. Quality Assurance (QA) Report. This report should address all the QA objectives, including whether or not precision and accuracy objectives were met, as well as results of quality control samples, performance audit samples, and systems audits.
- e. Waste Handling Documentation. ALCOA should provide documentation, such as copies of manifests and certificates of destruction, to show that all wastes generated during the operation of the study were properly disposed according to the regulations found in the Toxic Substances Control Act (TSCA), the Resource Conservation and Recovery Act (RCRA), and the Clean Water Act (CWA). All PCB waste and treatment residues generated during the test(s) must be disposed of by approved TSCA incineration.

according to 40 CFR 761.70, or by chemical waste landfill according to 40 CFR 761.75.

7. Facility Inspection: EPA employees shall have access to the ALCOA laboratories during the tests for purposes of inspection, observation, or sampling. This access is subject to the normal safety requirements placed on ALCOA personnel.

8. Facility Security: The ALCOA laboratories shall be secured (e.g., fence, alarm system, etc.) to restrict public access to the area. Any personal injury occurring as a result of the R&D activities must be reported to the EPA Region III PCB Coordinator, Ed Cohen (215-597-7668) (Fax Number 215-597-3156), by the next regular business day.

9. Safety and Health: ALCOA must take all necessary precautionary measures to ensure that the operation of the treatability studies on enhancement of PCB biodegradation comply with the applicable safety and health standards as required by Federal, state, and local regulations and ordinances.

10. PCB Spills: Any spills of PCB materials shall be promptly controlled and cleaned up in accordance with the guidance given in the TSCA PCB Spill Cleanup Policy and procedures (see 52 Federal Register, 10688, April 2, 1987). In addition, a written report describing the spill, operations involved, and cleanup actions must be submitted to EPA Region III within five (5) business days.

PCB spills must be reported in accordance with the PCB spill reporting requirements prescribed under Section 311 of the Clean Water Act for discharges to navigable waters; under the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund); and any other applicable Federal, state, or local reporting requirements.

11. Personnel Training: ALCOA is responsible for ensuring that personnel directly involved with handling PCBs or PCB-contaminated material during the ALCOA treatability studies are demonstrably familiar with the general requirements of this R&D approval. At a minimum, this information includes:

- a. the type of material that may be treated during the testing;
- b. basic reporting and recordkeeping requirements under this R&D approval and the location of records at the test site;
- c. notification requirements;
- d. waste disposal requirements for process wastes generated during the treatability testing;
- e. basic health and safety measures to be used during all treatability testing.

This R&D permit must be available upon request for use by ALCOA personnel involved

with the study.

12. PCB Transport Restrictions: PCB-contaminated soil and concrete not involved in the experiment may not be transported from the ALCOA Technical Center, except for purposes of proper disposal. PCB material transported for purposes of disposal must be in accordance with 40 CFR Part 761.40 and the DOT requirements of Title 49, CFR Part 172. Such requirements include placarding and labeling all PCBs.

13. Process/Equipment Modifications: Any departure from the conditions of this R&D approval, or from the terms of the application submitted by ALCOA, must receive prior written-authorization from EPA Headquarters. Verbal requests must be followed within ten working days by a written request from ALCOA describing all modifications. In this context, modifications are defined as any deviations from the permit conditions or from the data and materials that have been received by this Agency from ALCOA regarding the operation of this treatability testing program.

14. Permit Effective Dates: This R&D approval shall become effective on the date of signature and shall expire on December 11, 1999.

Each year, ALCOA may apply for a renewal of the approval within three months of the expiration date. Based on the R&D test report submitted by ALCOA at the time of the renewal application, EPA shall make a determination as to whether to renew this R&D approval.

Under the above conditions, and given the circumstances under which the R&D tests will be conducted, EPA Headquarters' National Program Chemicals Division finds, pursuant to 40.CFR Part 761.60(e) and (j), that these tests will not present an unreasonable risk of injury to health or the environment.

Approval to conduct R&D on the enhancement of biological degradation of PCBs and cleaning and coating techniques in contaminated matrices is hereby granted to ALCOA, subject to the conditions expressed herein, and consistent with the materials and data included in the application from ALCOA. Each party must comply with all terms and conditions of this approval, and failure to do so will be considered a violation of the PCB Rules and the Toxic Substances Control Act. This R&D approval is valid only when the research is conducted at the ALCOA Technical Center in Pennsylvania.

Sincerely,

Date

John W. Melone, Director
National Program Chemicals Division

APPENDIX

EXAMPLE THIRTY DAY NOTIFICATION FORM

Company Name, Address, Phone Number, and Contact Person:

Person, Organizational Affiliation/Title, and Phone Number for:

EPA Regional Contact:

State Contact:

Local (Town/City/County) Contact:

Nature of the Disposal Activity:

Kind of PCB Disposal Process:

Kinds of Material Containing PCBs:

Numbers and Sizes of Pieces of Equipment Containing PCBs:

Quantity of Solids and/or Volume of Liquids Containing PCBS:

Concentration(s) of PCBs in the Material to be Treated:

Location

Street Address or Other Identifier for All Sites:

Telephone Contact and Address for Site Manager:

Time of Processing

Date (s) :

Time (s) :

1998 September 09

Mr. Hiroshi Dodohara
Office of Toxic Substances
U.S. Environmental Protection Agency
Washington D.C. 20460
Fax (202)260-3959

Re: Approval for PCB Contaminated Concrete Cleaning/Coating Research

Dear Mr. Dodohara:

Please find attached a proposed plan for testing PCB Contaminated Concrete at the Alcoa Technical Center (Alcoa Center, PA 15069-0001, EPA ID# PAD004393138). The purpose of this testing is to determine the effectiveness of surface cleaning and coating techniques which are authorized for continued use by 40 CFR 761.30(p). Alcoa is requesting EPA's approval of this research under 40 CFR 761.60(j).

Per 761.60(j)(1) this letter serves as prior notification to EPA of these proposed research and development (R&D) activities. The quantity of PCBs to be treated, technology, material properties, and proposed quantities are listed in the attached plan. The study will be completed within a one year time frame. PCB wastes will be stored in compliance with 761.65(b) and will be manifested and disposed via TSCA permitted incineration. All USDOT requirements will be met. Also, record keeping requirements per 761.180 will be met.

Please be aware that the maximum concentration of PCBs in concrete as listed in the plan is 11,000 ppm PCB. This exceeds the concentration limitation in 40 CFR 761.60(j)(1)(iii), and thus requires prior written approval from EPA per 761.60(j)(2). Justification of use of this concentration is the 11,000 ppm PCB concentration is the maximum expected concentration of concrete core samples representative of actual plant conditions. Environment, health and safety controls (e.g. personal protective equipment (PPE), spill containment, decontamination procedures and ventilation) are in place such that there is no additional risk posed by the additional 1,000 ppm PCB concentration.

Note that Alcoa Technical Center currently conducts R&D on ways to enhance biological degradation of PCBs under EPA approval issued August 18 1993 and renewed annually. The proposed testing is viewed as an extension of these ongoing PCB research activities.

FAX
(724) 337-1264

MR. HIROSHI DODOHARA

1998 September 09

Page 2

Please contact me with any questions or additional data requirements at (724)337-5586.

Sincerely,

A handwritten signature in cursive script that reads "Thatcher Montgomery".

Thatcher Montgomery

Sr. Environmental Engineer

Alcoa Technical Center

cc: David Dzombak, CMU, Dept. of Civil and Environmental Engineering
Dennis Fulmer, C-ESTD
John Rind/John Lease, D-EHS
John Smith, C-ESTD
Margaret Tabe, C-ESTD

PLAN FOR TESTING WITH PCB-CONTAMINATED CONCRETE

ALCOA TECHNICAL CENTER

August 5, 1998

Research Contacts

David A. Dzombak
Carnegie Mellon University
Dept. of Civil and Environ. Eng.
Pittsburgh, PA 15213
Phone: 412-268-2946
Fax: 412-268-7813
Email: dzombak@cmu.edu

John R. Smith
Environ. Sci. and Technol. Dev. Group
Alcoa Technical Center
Alcoa Center, PA 15069
Phone: 724-337-5432
Fax: 724-337-5315
Email: john.r.smith@alcoa.com

Overview and Objectives

Alcoa is seeking to identify effective cleaning and coating (encapsulation) procedures for PCB-contaminated concrete, in order to comply with the provisions of the USEPA regulations governing continued use of PCB-contaminated concrete (40 CFR Parts 750 and 761, Disposal of Polychlorinated Biphenyls; Final Rule; Federal Register, 63(124):35383-35474, June 29, 1998).

The objectives of this sampling and monitoring effort are to assess the effectiveness of selected concrete cleaning procedures in removing PCBs from the surface and near-surface of concrete contaminated with PCB-bearing oils; to assess the rate of "bleedback" of PCBs and PCB oils from cleaned concrete; to assess the effectiveness of selected coating systems in encapsulating PCBs in concrete.

Concrete Sampling

Objective

Acquire fifteen 8-in. diameter concrete core samples for use in the laboratory tests of the effectiveness of different techniques for cleaning and coating PCB-contaminated concrete. Acquire four 2-in. diameter concrete core samples from same general area for characterization of PCB content.

Sampling Location and Amounts

Concrete cores for laboratory testing and characterization will be acquired from the floor of the 5000-ton press pit area at the Alcoa Vernon Works (EPA Generator ID No. CAD074126681; Aluminum Company of America, 540 Alcoa Avenue, Vernon, CA 90058). The core samples for laboratory testing will be 8.0 inches in diameter, and 5.0-8.0 inches in length. The core samples for characterization will be 2.0 inches in diameter and 5.0-8.0 inches in length. The samples will be wrapped in aluminum foil, and packed in a drum for shipment to the Alcoa Technical Center. For an average concrete unit weight of 145 lb/ft³, and assuming the maximum length of 8 inches for each core, the total weight of contaminated concrete samples received will be a maximum of 500 lb. Based on previous analyses of contaminated concrete from the Alcoa Vernon Works, the maximum PCB aroclor concentration (primarily Aroclor 1248) expected in the concrete cores is 11,000 mg/kg. The highest concentrations in the concrete at the site occur

in the top 2 inches of concrete, with dramatic decreases in concentrations at depths below 2 inches.

Concrete Core Sample Analysis

The 2-inch concrete core samples will be analyzed for PCBs as a function of depth. Each 2-inch concrete core sample will be divided into 1-inch sections, and each section will be analyzed for PCBs by Aroclor.

Tests of Concrete Cleaning Techniques

Objective

Evaluate the effectiveness of three techniques for removing oils and PCBs from contaminated concrete. Study the rate of PCB "bleedback" to the surface. Assess the ability of surface oil spills to enhance PCB bleedback rate.

Testing Protocol

Tests will be conducted with eight of the 8-inch diameter core samples. Cores will be selected that were obtained from the same proximity on the floor in the 5000-ton press extrusion pit area at Vernon. For each core, an initial wipe test will be performed to assess the magnitude of surface PCB contamination. Surface wipe testing will be performed using the conventional surface wipe testing method for PCBs.

The top surface of each of the eight cores will then be cleaned using three different sequential cleaning techniques that have been employed at other Alcoa facilities. Each of the three cleaning techniques will be applied to two different cores. One of the techniques will be applied to an additional two cores.

After cleaning is completed, the top surface of the two additional cores will be "painted" with a small amount of a clean (non-PCB) phosphate ester hydraulic oil currently used by Alcoa. The type and approximate volume of hydraulic oil used will be recorded. Two oil coatings will be applied with a spatula; the volume of hydraulic oil used will be small. It is expected that this will soak in and result in a slight discoloration of the cleaned concrete.

After the cleaning of the core surfaces and the application of hydraulic oil to two of the cores, the cores will be covered with aluminum foil.

Follow-up surface wipe testing of the core surfaces will be performed at intervals of approximately 2 weeks following the completion of cleaning, for a period of eight months. This sampling will be performed using the conventional surface wipe testing method for PCBs.

At the end of the eight month period, a 2-inch diameter core sample will be taken from all of the 8-inch diameter core samples. These 2-inch cores will be divided into 1-inch sections, each of which will be analyzed for total PCBs by aroclor.

Tests of Concrete Coating Techniques

Objective

Evaluate the effectiveness of three techniques for coating oil- and PCB-contaminated concrete. Study the rate of PCB "bleedback" to the surface.

Testing Protocol

Tests will be conducted with six of the 8-inch diameter core samples. Cores will be selected that were obtained from the same proximity on the floor in the 5000-ton press extrusion pit area at Vernon. For each core, an initial wipe test will be performed to assess the magnitude of surface PCB contamination. Surface wipe testing will be performed using the conventional surface wipe testing method for PCBs.

The top surface of each of the six cores will then be cleaned using a technique selected from those investigated in the first phase of the work, and then coated using three different epoxy coating techniques that have been employed at other Alcoa facilities. Each of the three coating techniques will be applied to two cores.

After the coating of the core surfaces, the cores will be covered with aluminum foil.

Follow-up surface wipe testing of the core surfaces will be performed at intervals of approximately 2 weeks following the completion of cleaning, for a period of eight months. This sampling will be performed using the conventional surface wipe testing method for PCBs.

At the end of the eight month period, a 2-inch diameter core sample will be taken from all of the 8-inch diameter core samples. These 2-inch cores will be divided into 1-inch sections, each of which will be analyzed for total PCBs by aroclor.

Waste Management

Upon completion of the study, all PCB contaminated wastes and debris will be sent from the Alcoa Technical Center to an EPA-approved TSCA incinerator for destruction.

Sites in Alcoa in Vernon, CA/O
IDCAD

1998 October 30

FAX TO: Hiroshi Dodohara
Office of Toxic Substances
US Environmental Protection Agency
Washington, D.C. 20460
Fax: (202)260-~~3555~~ 1724

FROM: Thatcher Montgomery
Sr. Environmental Engineer
Alcoa Technical Center
100 Technical Drive
Alcoa Center, PA 15069-0001

Phone: (724)337-5586

Fax: (724)337-1264

Re: PCB Research Locations

Number of pages: 2

Alcoa Locations with potential for applications of PCB research

<u>Location</u>	<u>City</u>	<u>State</u>	<u>EPA ID#</u>
Alcoa Technical Center	Alcoa Center	PA	PAD004393138
Cleveland Works	Cleveland	Ohio	OHD083321299
Davenport Works	Riverdale	IA	IAD005270160
Lafayette Works	Lafayette	Indiana	IND005478094
Lebanon Works	Lebanon	Pennsylvania	PAD001887579
Massena Operations	Massena	New York	NYD002232304
Rockdale Works	Rockdale	Texas	TXD008091712
Tennessee Operations - North Plant	Alcoa	Tennessee	TND987766136
Tennessee Operations - South Plant	Alcoa	Tennessee	TND987766144
Tennessee Operations - West Plant	Alcoa	Tennessee	TND003383551
Vernon Works	Vernon	California	CAD074126681
Warrick Operations	Newburgh	Indiana	IND006366819